

PART I GET STARTED

Today's Mathematics

We will subtract rational numbers by adding the opposite and use differences to find distance.

Essential Question

How can addition rules help us subtract rational numbers and measure distance?

DO NOW

Evaluate or identify.

1. $-3.6 + 1.9$

2. $\frac{5}{6} + (-\frac{1}{4})$

3. $-2\frac{1}{3} + \frac{5}{6}$

4. Write the additive inverse of -0.72.

SEE IT

Subtraction can be rewritten as addition of the opposite.

1. Rewrite $1.8 - (-0.6)$ as an addition expression.

2. Predict the sign of $-2.7 - 1.1$ before calculating.

3. Explain why subtracting a negative number moves right on a number line.

QUICK WRITE | 2 MINUTES

Describe the single change that turns a subtraction problem into an addition problem.

PART II INVESTIGATE**SUBTRACT BY ADDING THE OPPOSITE**

Complete the table. Write fractions in simplest form.

Expression	Add the opposite	Difference	Distance $ a - b $
$\frac{3}{4} - (-\frac{1}{2})$			
$-\frac{5}{6} - \frac{1}{3}$			
$-1.7 - 2.4$			
$-0.85 - (-1.15)$			

THINK LIKE A MATHEMATICIAN

1. Why does subtracting a negative number have the same effect as adding a positive number?
2. How are $a - b$ and $b - a$ related? Explain what happens to their signs and magnitudes.
3. Why is distance written as $|a - b|$ rather than simply $a - b$?

COMPARE

Without calculating first, decide which is greater: $-4.8 - 3.1$ or $-4.8 - (-3.1)$. Then verify.

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

1. Subtracting a rational number means adding its opposite: $a - b = a + (-b)$. 2. Once subtraction is rewritten as addition, use the rules for adding rational numbers. 3. Fractions must be written with a common denominator before their numerators are combined. 4. The distance between a and b is the nonnegative value $|a - b|$.

WORKED MODEL

Evaluate $-2\frac{1}{4} - (-\frac{5}{6})$. $-2\frac{1}{4} - (-\frac{5}{6}) = -\frac{9}{4} + \frac{5}{6} = -\frac{27}{12} + \frac{10}{12} = -\frac{17}{12} = -1\frac{5}{12}$. Reasonableness: $-2.25 - (-0.83)$ is about -1.42 , which agrees with $-1\frac{5}{12}$.

FOCUSED PRACTICE

1. Evaluate $\frac{7}{10} - (-\frac{3}{5})$.
2. Evaluate $-2.35 - 4.8$.
3. A diver is at -6.5 meters and descends 2.75 meters. Find and interpret the new position.

MATH WRITE | 5 MINUTES

A student says that subtracting a number always makes the result smaller. Explain the error and give a counterexample.

PART IV PUZZLE PRACTICE

Homework Name _____ Date _____

WHAT IS THE SUBTRACTION REMINDER?

Solve each problem. Find its answer in the bank and write the matching letter above the problem number. The letters reveal the reminder.

1. $\frac{3}{5} - \frac{1}{10}$
2. $-\frac{7}{8} - \frac{3}{8}$
3. $-1\frac{1}{2} - \frac{2}{3}$
4. $2.4 - (-3.1)$
5. $-5.75 - 1.25$
6. $-0.6 - (-1.35)$
7. $\frac{7}{12} - (-\frac{1}{3})$
8. $-2.8 - 4.6$
9. $-\frac{3}{4} - 1\frac{1}{4}$
10. $1.05 - (-0.25)$
11. $-2\frac{2}{5} - (-\frac{3}{5})$
12. A balance is $-\$4.50$. Then $\$2.25$ is withdrawn. Find the new balance.

ANSWER BANK

C	$\frac{1}{2}$	H	$-\frac{5}{4}$	A	$-2\frac{1}{6}$
N	5.5	G	-7	E	0.75
T	$\frac{11}{12}$	O	-7.4	P	-2
L	1.3	U	-1.8	S	$-\$6.75$

CODE BOXES

1	2	3	4	5	6
7	8	9	10	11	12